

ABSTRACT

2 An apparatus for carrying out a process of converting hydrocarbon fuel to a
3 hydrogen rich gas including a first heat exchanger for heating the hydrocarbon fuel to
4 produce a heated hydrocarbon fuel, a first desulfurization reactor for reacting the heated
5 hydrocarbon fuel to produce a substantially desulfurized hydrocarbon fuel, a manifold for
6 mixing the substantially desulfurized hydrocarbon fuel with an oxygen containing gas to
7 produce a fuel mixture, a second heat exchanger for heating the fuel mixture to produce a
8 heated fuel mixture, an autothermal reactor including a catalyst for reacting the heated
9 fuel mixture to produce a first hydrogen containing gaseous mixture, a second
10 desulfurization reactor for reacting the first hydrogen containing gaseous mixture to
11 produce a second hydrogen containing gaseous mixture that is substantially desulfurized,
12 a water gas shift reactor for reacting the second hydrogen containing gaseous mixture to
13 produce a third hydrogen containing gaseous mixture with a substantially decreased
14 carbon monoxide content, and a selective oxidation reactor for reacting the third
15 hydrogen containing gaseous mixture to produce the hydrogen rich gas.